



## Piraeus Bank Greek Corporate Bond Index

Given the lack of liquidity in the Greek banking system in addition to the overall trend for alternative sources of financing of non-financial corporations from outside the banking system, there is an upward trend of corporate bonds issuance by large Greek corporations with an international orientation. Greek enterprises, seizing on the significant improvement in the investment climate and in particular on the interest of foreign investors in Greek assets, issued six new corporate bonds totaling €2.85 billion during 2013.

Despite the increased investor appetite, until now there hasn't been an index reflecting the overall evolution and total returns of this nascent section of the market. Filling this gap, the Greek Corporate Bond Index reflects the price of 12 key corporate bonds that have been issued by eight Greek corporations.

Movements in the index and the comparison between it and the Bloomberg EUR High Yield Corporate Bond Index are indicative of the trends in the Greek economy as well as of the willingness of international investors to assume risk in the Greek bond market. From its creation on 2/1/2013 to the end of 2013, the index increased from 100 points to 115.14 points showing a total return of 15.1% compared to 7.9% for the European index. The co-variation of the two indices is noteworthy because it indicates that despite its limited liquidity the Greek bond market follows European trends. However, the higher daily total returns of Greek bonds reflect the sharp decline in Greek bond yields, which derives from the decrease in the Greek risk premium. In addition to investors' capital gains, the decline in Greek bond yields will have a

Piraeus Bank

Economic Analysis & Markets

Ilias Lekkos  
[LekkosI@piraeusbank.gr](mailto:LekkosI@piraeusbank.gr)

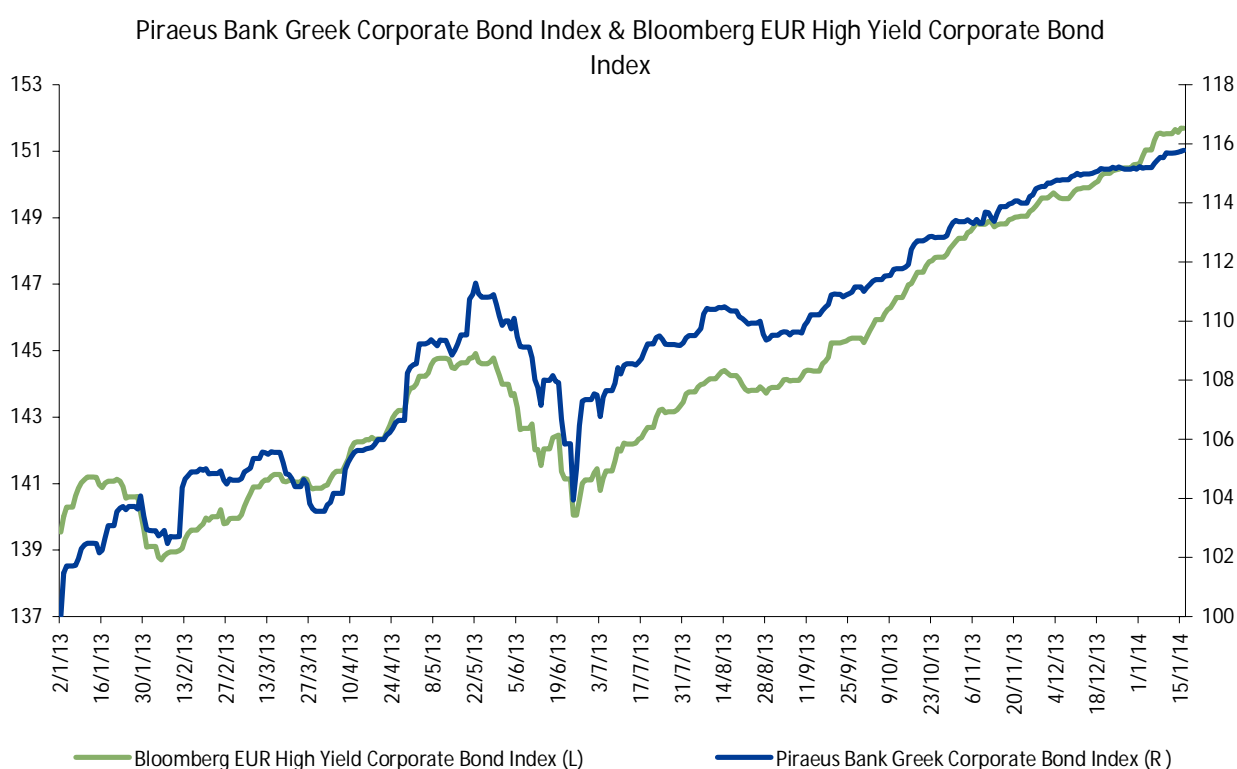
Dimitria Rotsika  
[RotsikaD@piraeusbank.gr](mailto:RotsikaD@piraeusbank.gr)

[researchdivision@piraeusbank.gr](mailto:researchdivision@piraeusbank.gr)  
Bloomberg: <PBGR>

Piraeus Bank Group  
Amerikis 4, 105 64, Athens

Tel: (+30) 210 328 8187  
Fax: (+30) 210 328 8605

wider positive influence, as it makes issuing new corporate bonds even more attractive. The new issues will correspond to the new lower interest rate, significantly reducing financing costs for Greek corporations and allowing them to utilize their resources not only to refinance previous loans, but also to finance new investment schemes.



Source: Piraeus Bank Research

Ilias Lekkos  
Group Chief Economist

## Data and Characteristics

The basic selection criteria is that bonds are issued by Greek corporations, which may be either private or listed in an organized market in Greece or in another country. Moreover, bonds must be issued in a common currency, which, as far as the Greek Corporate Bond Index is concerned, is the Euro. Bonds issued by financial institutions and the Hellenic Railways Organization (OSE) have been excluded, as the aim of our Index is to represent alternative sources of financing of Greek corporations.

The main source of information and data for the estimation of the Index is Bloomberg and the companies' websites. In the following table, we present the final constituent list of the Greek Corporate Bond Index, along with the main characteristics of each bond. These are: amount issued, amount outstanding, currency, coupon, coupon type, coupon frequency, announcement date, maturity and the bond rating.

Piraeus Bank Greek Corporate Bond Index Constituents									
Corporation	Amount Issued (€ mn.)	Amount Outstanding (€ mn.)	Currency	Coupon	Coupon Type	Coupon Frequency	Announcement Date	Maturity	Bond Rating (Standard & Poor's)
Yioula Glassworks	146.1	139	€	9.000	Fixed	Semi-Annual	10/11/2005	01/12/2015	CC
Hellenic Petroleum	500	500	€	8.000	Fixed	Semi-Annual	29/04/2013	10/05/2017	--
OTE PLC	900	895	€	4.625	Fixed	Annual	14/11/2006	20/05/2016	BB-
OTE PLC	787.749	787.749	€	7.250	Fixed	Annual	12/02/2008	12/02/2015	BB-
OTE PLC	500	382.6	€	7.250	Fixed	Annual	04/04/2011	08/04/2014	BB-
OTE PLC	700	700	€	7.875	Fixed	Semi-Annual	29/01/2013	07/02/2018	BB-
Titan Global Finance	200	200	€	8.750	Fixed	Semi-Annual	17/12/2012	19/01/2017	BB
Coca-Cola HBC	700	700	€	7.875	Fixed	Semi-Annual	09/11/2009	16/11/2016	BBB
Coca-Cola HBC	800	800	€	2.375	Fixed	Annual	10/06/2013	18/06/2020	BBB
Frigoglass	250	250	€	8.250	Fixed	Semi-Annual	13/05/2013	15/05/2018	BB-
Intralot	325	325	€	9.750	Fixed	Semi-Annual	01/08/2013	15/08/2018	B+
SB Minerals	275	275	€	9.250	Fixed	Semi-Annual	30/07/2013	15/08/2020	B+

Source: Piraeus Bank Research, Bloomberg

It is important to note that half of our Index's constituents were issued in 2013, a fact that reflects Greek corporations' need for alternative sources of financing due to current increased financial costs. It also signals that this practice will continue in the future.

Eight different sectors of the economy are represented in the index, covering a wide range of business activity. Specifically, these sectors are:

Sector of the Economy that constitute the Piraeus Bank Greek Corporate Bond Index	
Sector	Number of Bonds
Manufacture of hollow glass	1
Manufacture of Refined Petroleum Products	1
Telecommunications	4
Manufacture of Cement	1
Manufacture of Soft Drinks, Production of Mineral Waters & Other Bottled Waters	2
Manufacture of Non-Domestic Cooling & Ventilation Equipment	1
Computer Programming Activities	1
Manufacture of Other Non-Metallic Mineral Products	1
<b>Total no. Bonds</b>	<b>12</b>

*Source: Piraeus Bank Research*

## Methodology and Creation of Index

The greatest challenge that had to be faced when creating the index was developing the methodology to be followed with regards to assigning the appropriate weight to each bond, how the weighting of each bond would change in the case of a new issuance and the rebalancing of the index in the case of coupon payments.

### Weighting

The key assumption is that the index captures the total amount of outstanding bonds, which means that the investor buys the market. We assume that the Index measures the return on a portfolio which holds each bond in proportion to its market value. Based on this assumption, we conclude that it is the relative market value of a bond that must be taken into account, as the coupon reinvestment in every bond does not affect their relative market values. What indeed is affected by the coupon reinvestment is the total return of the bond and consequently of the index.

In the following table, we present the weighting of each bond in January 2014:

Piraeus Bank Greek Corporate Bond Index Weights	
	Jan-14
Yioula Glassworks	2.4
Hellenic Petroleum	8.5
OTE PLC (2016)	15.3
OTE PLC (2015)	13.5
OTE PLC (2014)	6.5
OTE PLC (2018)	12.0
Titan Global Finance	3.4
Coca-Cola HBC (2016)	10.2
Coca-Cola HBC (2020)	13.7
Frigoglass	4.3
Intralot	5.6
SB Minerals	4.7
	100.0

Source: Piraeus Bank Research

### *Rebalancing*

The Greek Corporate Bond Index is rebalanced regularly so as to incorporate any changes, such a new issuance and coupon payments. The rebalancing takes place on a daily basis, as we believe that the daily rebalancing best reflects the dynamics of the current investment climate that a portfolio manager might have to face.

- A new bond issue is added to the index on the day of the issue.
- The daily total returns of the bond and of the Index following the addition of the new bond are calculated one day after the issue date.

### *Calculation of the Daily Total Returns of the Index*

Daily total returns of the index measure the total returns of the bonds of the index, including the accrued interest and coupon payments. The return of one day from time point t-1 to time point t-2 are estimated as follows:

$$dr_t = \frac{\sum_i AO_{i,t-1} * (P_{i,t} + AI_{i,t}) / 100}{\sum_i AO_{i,t-1} * (P_{i,t-1} + AI_{i,t-1}) / 100} - 1$$

Where P: Bond market Price

AI: Accrued Interest

AO: Amount Outstanding

In the case of a coupon payment on that particular day, the formula is::

$$dr_t = \frac{\sum_i AO_{i,t-1} * (P_{i,t} + AI_{i,t}) / 100 + \sum_i C_{i,t}}{\sum_i AO_{i,t-1} * (P_{i,t-1} + AI_{i,t-1}) / 100} - 1$$

Where

- P: Bond market Price
- AI: Accrued Interest
- AO: Amount Outstanding
- C: Coupon

As a result, the total return of the index between t-k and t is:

$$r_{t-k,t} = \frac{Index_t}{Index_{t-k}} - 1$$

### *Calculating the Yield of the Index*

The average index yield is measured as the weighted average yield of each bond in relation to the amount outstanding.

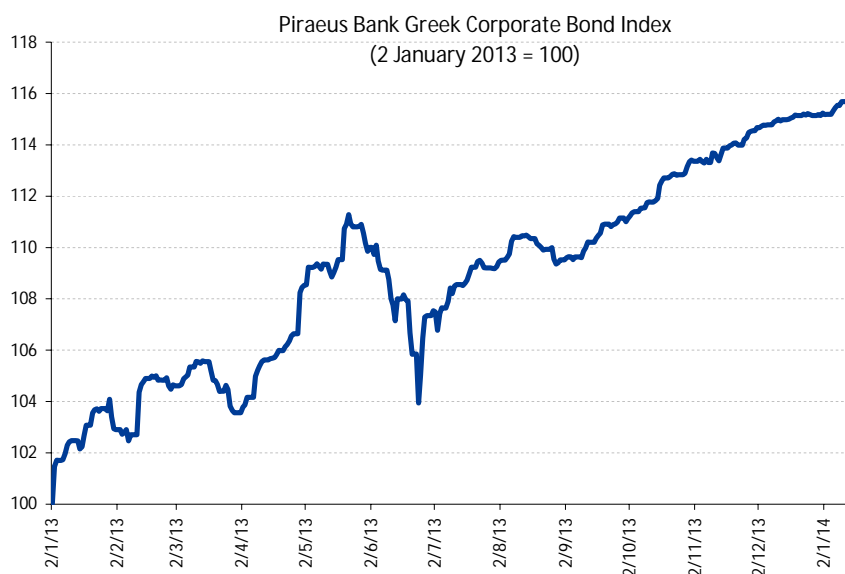
### *Building The Index*

On its inception date (2/1/2013) the index was set at 100. Consequently the value of the Index is calculated as follows:

$$Index_t = Index_{t-k} * (1 + dr_{t-k+1}) * \dots * (1 + dr_{t-1}) * (1 + dr_t)$$

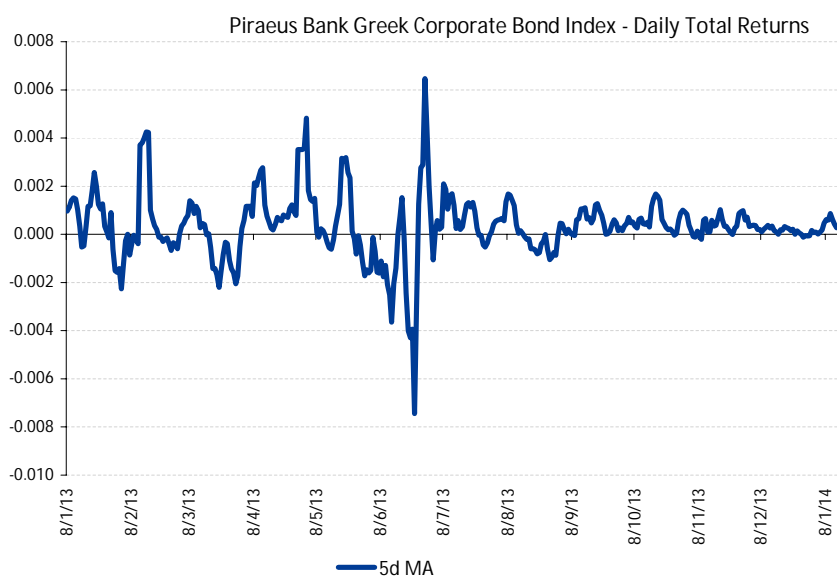
## The Greek Corporate Bond Index and International Markets

The Greek Corporate Bond Index that derives from our analysis with a starting price of 100 on January 2, 2013 is illustrated in the following chart:



Source: Piraeus Bank Research

In the following line chart, we report the daily total returns of the Index on a five day moving average.



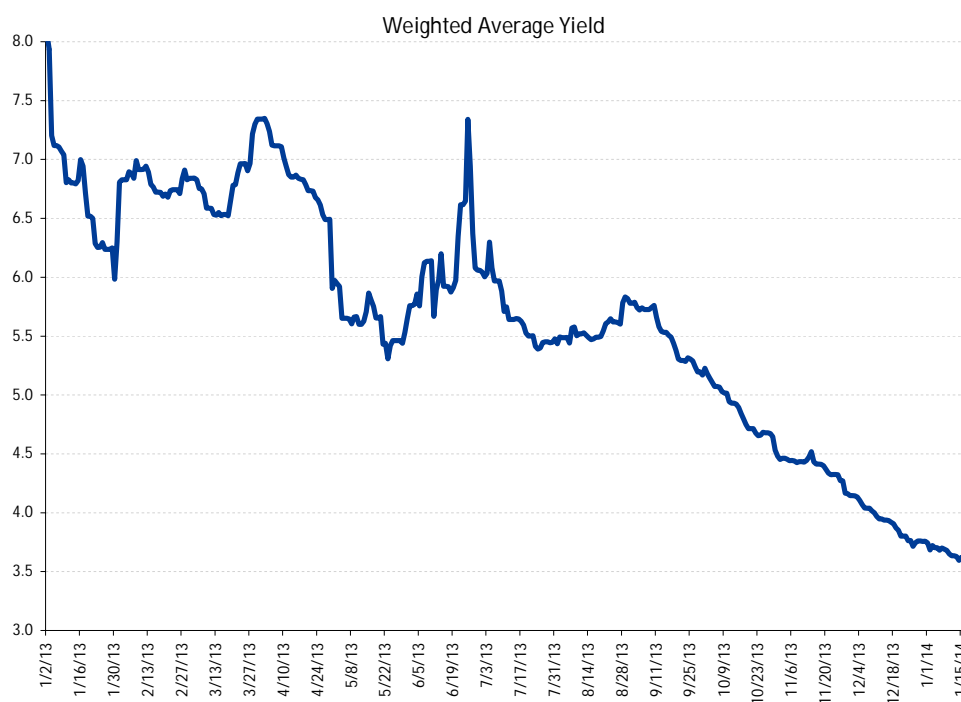
Source: Piraeus Bank Research

While in the following table, the weighted average yield for end 2013 and the latest observation is:

Weighted Average Yield	
31 December 2013	3.76
16 January 2014	3.59

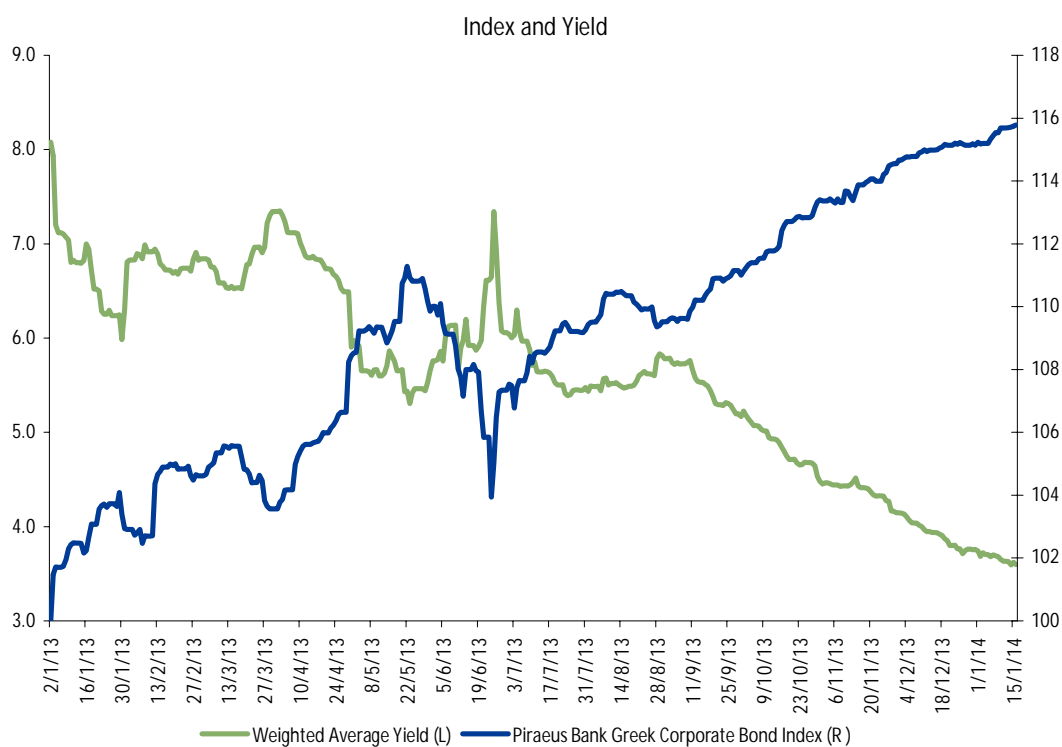
Source: Piraeus Bank Research

The evolution of the weighted average yield is represented in the following line chart:



Source: Piraeus Bank Research

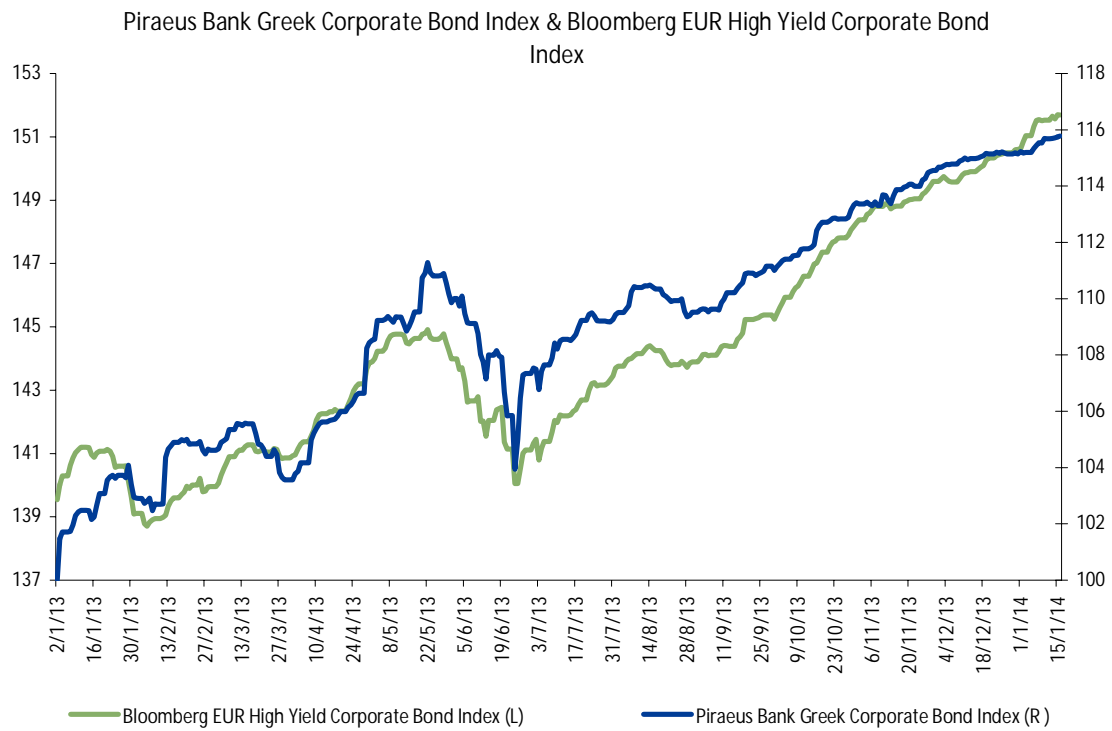
### Relationship between the Greek Corporate Bond Index and its Yield



Source: Piraeus Bank Research

GREEK CORPORATE BOND INDEX

What is of particular interest is the comparison of the main Bloomberg EUR High Yield Corporate Bond Index for high yield European corporate bonds to the Greek Corporate Bond Index for the same time periods. Our main finding is that Greek corporate bonds offer a higher yield, while, however, following global market trends.



Source: Piraeus Bank Research



## Economic Analysis & Markets

Lekkos Ilias	Chief Economist	+30210 3288120	Lekkosi@piraeusbank.gr
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## Greek Economy

Staggel Irini	Senior Economist	+30210 3288192	Staggelir@piraeusbank.gr
Kefalas Konstantinos	Economic Analyst	+30210 3739369	Kefalask@piraeusbank.gr

## Developed Economies

Polychronopoulos Dionisios	Economic Analyst	+30210 3288694	Polychronopoulosd@piraeusbank.gr
Papakostas Chrysovalantis	Economic Analyst	+30210 3298778	Papakostasc@piraeusbank.gr
Konstantou Evaggelia	Economic Analyst	+30210 3739749	KonstantouE@piraeusbank.gr

## Developing Markets

Rotsika Dimitria	Economic Analyst	+30210 3288365	Rotsikad@piraeusbank.gr
Margariti Konstantina	Junior Economic Analyst	+30210 3739642	Margaritik@piraeusbank.gr

## Sectoral Studies

Daggalidis Athanasios	Senior Economist	+302310 293564	Athanasios.Dagalidis@piraeusbank.gr
Vlachou Paraskeui	Economic Analyst	+30210 3335631	Vlachoupar@piraeusbank.gr
Fraggoulidou Ifigenia	Junior Economist	+302310 293403	FragkoulidouI@piraeusbank.gr

## Secretary

Papioti Evaggelia	Secretary	+30210 3288187	PapiotiE@piraeusbank.gr
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